

REMARKS/ARGUMENTS

Initially, Applicants would like to express their appreciation to the Examiner for the detailed Official Action provided.

In the outstanding Official Action, claims 11, 18, 21, and 22 were rejected under 35 U.S.C. § 103(a) over ANDREW (U.S. Patent No. 6,904,402) in view of RAMAMURTHY et al. (U.S. Patent No. 5,675,384) and ENDOH et al. (U.S. Patent No. 4,652,935). Claim 14 was rejected under 35 U.S.C. § 103(a) over ANDREW in view of RAMAMURTHY, further in view of ENDOH, and further in view of ENOKIDA (U.S. Patent No. 5,608,862, *incorrectly identified in the Official Action as U.S. Patent No. 5,6087,862*). Claims 19 and 20 were rejected under 35 U.S.C. § 103(a) over ANDREW in view of RAMAMURTHY, further in view of ENDOH, and further in view of CURRY (U.S. Patent No. 5,710,636). Claims 15-17 were rejected under 35 U.S.C. § 103(a) over ANDREW in view of RAMAMURTHY, further in view of ENDOH, and further in view of IMAIZUMI et al. (U.S. Patent No. 5,987,176).

Upon entry of the above amendment, claim 11, 18, 20 and 21 will have been amended for consideration by the Examiner. The amendments to the claims are not intended to limit or narrow the scope of the claims; rather, the herein-contained amendments are intended only to clarify the subject matter recited in the rejected claims.

In view of the herein-contained amendments and remarks, Applicants respectfully request reconsideration and withdrawal of each of the outstanding rejections of claims in the present application, and submit that such action is believed to be appropriate and proper.

Applicants traverse the rejections of claims 11 and 14-22. In this regard, Applicants' claims 11 and 14-19 generally relate to an image processing apparatus which includes an orthogonal transformer configured to transform multi-bit image data into orthogonal transform coefficients, and a quantizer configured to quantize the orthogonal transform coefficients for each spatial frequency of the multi-bit image data. The spatial frequencies include a DC component, low frequency AC components, and high frequency AC components. A first number of quantization bits is assigned to the DC component, a second number of quantization bits is assigned to all the low frequency AC components, and a third number of quantization bits is assigned to all the high frequency AC components. The second number of quantization bits is a multiple of the first number of quantization bits, and the third number of quantization bits is a multiple of the first number of quantization bits. The third number of quantization bits is different than the first number of quantization bits.

The image processing apparatus also includes a block data generator which generates a block of data composed of the quantized data of each spatial frequency. Further, the image processing apparatus includes a frequency bander which rearranges the quantized data in the generated block of data so as to band the quantized data of each spatial frequency and so as to align the quantized data of a spatial frequency of the generated block of data with the quantized data of the same spatial frequency of the next generated block of data. The image processing apparatus also outputs, as bit serial data, the quantized data of the spatial frequency over multiple rearranged blocks. Moreover, the image processing apparatus includes a coder which compresses the bit serial data, using a coding system for facsimile communication.

Claim 20 generally recites a related multifunction apparatus. Claims 21 and 22 generally recite related methods.

Applicants respectfully traverse the outstanding rejections. The Official Action does not provide any proper motivation to perform the extensive modifications to ANDREW that would be required to obtain the invention recited in Applicants' claims. In this regard, the Official Action acknowledges numerous shortcomings to the teachings of ANDREW at, e.g., pages 3, 6, 7, 9 and 11 of the Official Action. However, the Official Action asserts at, e.g., page 4-5 of the Official Action, that it would be obvious to modify the teachings of ANDREW with the teachings of RAMAMURTHY and ENDOH because the three are from "the same field of endeavor of data compression", and in order to "support the maintaining quality of service while performing source quantization adjustment... as well as to support progressive encoding, which in turn supports progressive transmission of data".

Even if taken as true, the above-noted assertions do not provide a proper motivation to modify ANDREW with the extensive modifications that would be necessary to obtain the invention recited in the pending claims. Rather, the cited motivations are generic motivations that would presumably apply to any application relating to the fields of the applied documents, and not any proper and specific motivation to perform the numerous modifications to ANDREW necessary to address the numerous shortcomings acknowledged at pages 3, 6, 7, 9 and 11 of the Official Action.

In any case, even the combination of documents applied in the Official Action does not render obvious the invention recited in Applicants' pending claims. In this

regard, ANDREW relates to hierarchically encoding and decoding an image, and discloses rearranging coefficients (col.6, lines 48-53, col.8, lines 22-44). However, ANDREW does not disclose a block data generator that generates a block of data, the block of data being composed of the quantized data of each spatial frequency. As shown in Fig. 2 of ANDREW, there is no element between the quantizer 201 and the coefficient rearrangement device 202.

The Official Action asserts that ANDREW discloses "generating a block of data... comprising the quantized data of each spatial frequency" at Fig. 2, element 201 and at col. 6, lines 44-48. This is incorrect, as element 201 of Fig. 2 in ANDREW merely indicates the quantizer. Further, col. 6, lines 44-48 of ANDREW merely discloses that "[e]ach DCT coefficient is quantized by a quantizer 201 also according to the JPEG baseline standard". Thus, this portion of ANDREW does not contain any disclosure regarding a block data generator, as recited in the pending claims. Therefore, ANDREW also does not disclose a block data generator that generates a block of data, the block of data being composed of the quantized data of each spatial frequency.

Further, the Official Action acknowledges that ANDREW does not disclose the spatial frequencies including a DC component, low frequency AC components, and high frequency AC components, a first number of quantization bits being assigned to the DC component, a second number of quantization bits being assigned to all the low frequency AC components, a third number of quantization bits being assigned to all the high frequency AC components, the second number of quantization bits comprising a

multiple of the first number of quantization bits, and the third number of quantization bits comprising a multiple of the first number of quantization bits.

The Official Action also acknowledges that ANDREW does not disclose a frequency bander which outputs, as bit serial data, the quantized data of the spatial frequency over a plurality of the rearranged blocks. Further, the Official Action acknowledges that ANDREW does not disclose a coder which compresses the bit serial data, using a coding system for facsimile communication.

In other words, ANDREW does not disclose numerous elements as each is recited in the pending claims (e.g., the quantizer, the block data generator, the frequency bander and the coder). Therefore, it is respectfully submitted that the features as each is recited in Applicant's independent claims 11, and 20-22 are not disclosed by ANDREW.

The Official Action asserts that it would be obvious to modify ANDREW with the use of a quantization method as in RAMAMURTHY. However, the disclosure of RAMAMURTHY is inadequate to supply the deficiencies acknowledged with respect to ANDREW.

In this regard, RAMAMURTHY relates to VBR MPEG video encoding for an ATM network. The Official Action asserts that RAMAMURTHY discloses a quantization method that, for each block of coefficients, applies the same quantization step to all the coefficients (col. 4, lines 14-16) for each block of coefficients. The Official Action also asserts that RAMAMURTHY discloses that the third number of quantization bits is the same as the first number of quantization bits.

The Official Action asserts, at page 4, that "applying the same quantization step to both the DC and the AC coefficients implies that the same number of bits is allocated to each quantized coefficients... [s]ince there is only one DC coefficient, the total number of bits allocated to all low-frequency (respectively, high-frequency) quantized AC coefficients is a multiple of the number of bits allocated to the quantized DC coefficient, irrespective of how low- and high-frequency coefficients are delineated". However, the above-noted statement is unsupported, as there is no evidence provided in the outstanding Official Action that "applying the same quantization step... implies that the same number of bits is allocated to each quantized coefficients".

Further, there is no evidence that any reference positively "assigns" (or allocates) a particular numbers of bits to different components such as a DC component, low frequency AC components and/or high frequency AC components. In this regard, the claims refer to the number of bits assigned to the DC component, the low frequency AC components and the high frequency AC components.

Thus, RAMAMURTHY does not disclose that the same number of bits are assigned to each quantized coefficient, or that a specified number of bits are assigned to, e.g., "all the low frequency AC components" and/or "all the high frequency AC components". In any case, Applicants have amended the independent claims to clarify this feature of the claimed invention by reciting that "the third number of quantization bits [is] different than the first number of quantization bits". Applicants submit that, in addition to the above-noted deficiencies of the proposed combination of ANDREW and RAMAMURTHY, the proposed combination would not disclose the claimed combination that includes the newly recited feature.

Thus, RAMAMURTHY fails to disclose numerous elements as each is recited in the pending claims (the claimed quantizer, the claimed block data generator, the claimed frequency bander and the claimed coder), each of which are also not disclosed by ANDREW. Therefore, it is respectfully submitted that the features as each is recited in Applicant's independent claims 11, and 20-22 are not disclosed or suggested by even the combination of ANDREW and RAMAMURTHY.

Further, the Official Action relies on ENDOH for the deficiencies of the combination of ANDREW and RAMAMURTHY. However, the disclosure of ENDOH is inadequate to supply the deficiencies of ANDREW and RAMAMURTHY.

ENDOH relates to a graded facsimile image signal coding system. The Official Action asserts that ENDOH discloses outputting data in bit planes and using a coding system for facsimile to encode them. However, even if taken as true, ENDOH fails to disclose at least numerous of the remaining elements as each is recited in the pending claims (e.g., the quantizer, the block data generator, and the frequency bander).

Accordingly, it is respectfully submitted that the features as each is recited in Applicant's independent claims 11, and 20-21, which are not rendered obvious by even the combination of ANDREW and RAMAMURTHY, are also not rendered obvious by the combination of ANDREW, RAMAMURTHY and ENDOH. Thus, each of independent claims 11, 20 and 21 is submitted to be patentable over the combination proposed in the Official Action.

Applicants also submit that claims 14-19 and 22 are allowable at least for depending, directly or indirectly, from an allowable independent claim, as well as for the

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reason that these dependent claims recite additional features which further define the present invention over the references of record.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections, as well as an indication of the allowability of all the claims pending in the present application in due course.




SUMMARY AND CONCLUSION

Applicants have made a sincere effort to place the present application in condition for allowance and believe that they have now done so. Applicants have amended the claims to more clearly recite the features of the claimed invention. Applicants have also discussed features which distinguish the claimed invention from the disclosure of the documents applied in the Official Action. Accordingly, Applicants have provided a clear evidentiary basis supporting the patentability of each of the claims now pending.

Each of the amendments contained herein, which has not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Should the Examiner have any questions or comments regarding this Response, or the present application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,  
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